



AARC Bulletin

Newsletter of the Albemarle Amateur Radio Club, W4ATFZ

September 1993



Albemarle Amateur Radio Club

P.O. Box 6833

Charlottesville, VA 22906

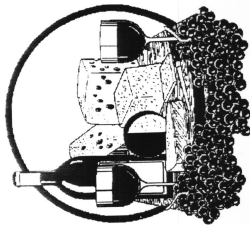
SEPTEMBER 14, 1993 MEETING NOTICE.

6:00 PM MCINTIRE PARK SHELTER NUMBER TWO.

Talk in on the all new 146.76 repeater.

KA4JJD 1993
Michael Rein
109 Sturbridge Rd.
Charlottesville VA 22901

AARC ANNUAL PICNIC

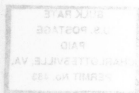


Send articles for the AARC Bulletin to the editor.

DEADLINE for the October issue is September 15, 1993

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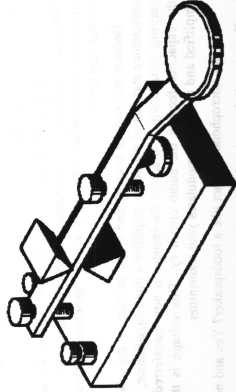
cause the action to either increase or decrease, resulting in the diaphragm's moving in accordance with the modulating voltage.

If you really work all of this out, however, you'll probably find out that the diaphragm will move in a nonlinear fashion and might even produce twice its input frequency. This is why I said that the mike can work as a loudspeaker, but with conditions.

Actually, loudspeakers have been built using these principles, and are known as "electrostatic speakers." In order to obtain better linearity and reduce distortion and doubling, the fixed plate is sandwiched between two, fixed screens. High voltage is applied between the fixed screens and the center diaphragm. Modulation is between the two fixed screens so that, as one screen attracts the diaphragm, the other repels it, and vice versa as the AC input voltages changes direction.

In modern capacitor mikes, the high voltage is replaced by an "electret." This is a special wax which, as it is heated, can be charged and this charge will remain for many years thereafter. I am vague as to the rest of the details. This electret system eliminates the need for the high voltage and results in today's light-weight capacitor mikes.

● Joe Giovandoli, W2PVI



The President's Letter

Fall is in the air. School will open soon and as the days begin to shorten in length the time has come to prepare for the winter days ahead. Now is a good time to check the antenna feedlines, tighten guy wires and check the ropes that hold the wire antennas in place. There is still time to get one more antenna installed before the colder weather arrives.

It's a good time to make contact with your local school and offer to demonstrate Amateur Radio. It's an excellent time to make connections with the scout troop at your place of worship. In the past few years we have done presentations to Boy Scouts, Cub Scouts and the Civil Air Patrol. If you know students or leaders in these groups, talk to them about Amateur Radio. If you want to put on a presentation, but would like some help, let me know. I am certain we can find someone who is ready, willing and able to help.

● 73, Bob, K4ADU

September Meeting

The September meeting will be a short business session followed by the Annual AARC picnic. It will be held at McInire Park in Shelter 2 which is down by the ball field. The meeting/picnic will begin at 6:00. Please bring enough food for yourself and a little bit to put in the "pot". The business meeting will include forming the Nominations Committee to choose officers for the coming year. Also, the Awards Committee will have certificates to give out. Please be aware that the meeting will need to end by 8:30 as the park closes at dark.

VEEP'S Corner

After I talked to Ed, KC4YLX, a couple of days ago, he indicated to me that he wants to make the Bulletin a monthly affair. I said I thought it was a great idea. He then told me that I would have a deadline to meet every month now. Me and my big mouth....Hi. The Sperry tour went well and I would like to say thank you to Will, K14XZ. I am looking forward to the picnicmeeting in September. Please be sure you bring enough for yourself and a little bit to put in the "pot". After the Field Day picnic, I know we have some great chefs with excellent recipes, so I look forward to stuffing myself.

I would also like to take this time to remind everyone that nominations for next year's club officers are coming up real soon and we (The Awards Committee) need your nominations for Elmer certificates, Ham of the Year, etc. Please get them to us as soon as possible.

I was also reminded that I missed a couple of thank yous in my last column. I would like to belatedly say thank you to Nancy Hillman, KD4LSU, Karen Taylor, wife of Pete (KC4UCK), and my wife, El, KD4GIX for the effort they put forth for our Field Day picnic.

The replacement insurance for all the club's equipment has been mailed in and should be in effect by the time you read this. I am looking forward to getting the new 146.76 machine up as well as using the beefed-up 146.925 machine. And let us not forget the new 224.76 machine which will probably be up also by the time you read this (I know I said that last month, but this time I mean it....Hi)

I have not heard from very many people concerning the idea of our club having a yearly special event, such as for our Dogwood Festival, so I consider that to mean that there is no general support for this proposal, and as such, it is a dead issue. Oh well.

● Bill KCAIOP

source is grounded. The audio input to the mike amplifier is connected to one terminal of a capacitor, with the other terminal of the capacitor connected to the junction of the resistor and capacitor (our mike).

How does this arrangement work as a microphone? Remember that one plate of this capacitor is a diaphragm, capable of moving in accordance with the sounds produced by the talker. Let's start this way: We turn on the high voltage. Voltage flows through the resistor and causes the capacitor to charge. When the capacitor is fully charged, no further current flows through the resistor. Of course, during the time that current flowed, a voltage was produced across the resistor--and we know this from Ohm's Law.

As the talker speaks, the diaphragm moves inward, this means that the plates which make up the capacitor are closer to each other. This, in turn, means that the capacitance increases. Because it does, it is capable of being charged further, so voltage again flows through the resistor on its way into the mike.

Next, the diaphragm moves outward, reducing the amount of capacitance and the ability of the capacitor to store electrons. Therefore, the capacitor is forced to give up some of its electrons, forcing current to flow through the resistor once again, but it will flow in the opposite direction to what it had done when the capacitor was charging.

As we examine all of this, we see a familiar pattern. We see a diaphragm moving in accordance with the amplitude and frequency of the talker. We see a voltage generated (across a resistor this time).

Because this resistor is connected to the junction of the mike's capacitance and that of the audio amplifier's input capacitance, the varying voltage which is across the resistor is now transferred to the capacitor feeding the audio circuitry. This voltage is then amplified and eventually modulates your transmitter.

Can this microphone also act like a loudspeaker? Yes and no.

Keep in mind our circuit. The high voltage will tend to attract the diaphragm to the fixed one. The variations in voltage will

works. Keep in mind that, when a voltage is applied to a coil, current flows in that coil. Current flowing in a coil will result in a magnetic field surrounding the coil. You realize that this magnetic field is near to the one which I described originally. When a voltage is applied to the coil, the mutual attraction and repulsion between magnetic fields changes, depending on the strength and the polarity of the voltage impressed on the coil. This, therefore, is why the diaphragm of a dynamic mike can move when its voicecoil is fed with electrical signal.

What I have described is the operating principle of most loudspeakers.

You might ask: Why can't we use a loudspeaker as a microphone?"

You can, but the sound produced from it will not be very good. This has to do with the physical mass of the loudspeaker diaphragm, or cone. The greater the mass, the greater the inertia of the diaphragm. Thus, it takes time to get the diaphragm moving and it takes time to stop that motion. A loudspeaker will tend to respond poorly at high frequencies when it is used as a microphone.

The Condenser, or Capacitor, Mike. We are beginning to see a large number of these microphones used in modern ham gear. They are light-weight devices and are inexpensive to produce.

The condenser mike employs a movable plate (its diaphragm) and a fixed plate. These are mounted very close together and form a capacitor. From your theory, you know that a capacitor can store electrons, and the number of electrons stored will depend upon the capacitance of the capacitor.

In order to understand how a capacitor can act as a microphone, you need to either visualize or to draw out the following circuit:

One plate of our capacitor is grounded. (This is usually the diaphragm.) The second plate is connected to one end of a high-ohmage resistor, perhaps 1 megohm or higher. The other end of the resistor is connected to a source of high voltage, perhaps 100 to 200 volts. The negative terminal of this voltage

Treasurer's Report

As of August 10, 1993

Club Fund	\$139.38
Repeater Fund	1,436.05
Packet Fund	0.00
Total on hand	1,575.43

The total amount including donations, proceeds from raffles and surplus sales, that has been raised for the 220 Repeater Fund amounted to \$677.50. The Board of Directors of the Club at their July 6, 1993 meeting voted to purchase the repeater for \$1295.00, the difference remains to be raised.

At the same meeting, there was discussion about combining the two repeater funds to simplify accounting procedures, and the Treasurer was so directed.

Contributions to the Packet Fund in the amount \$253.39 have been raised so far this year, and on July 27, 1993 a check in this amount was sent to the SYSOP.

The Board also directed the Treasurer to close out the Link Fund, which had been generated by KB4JNI in sales of 900 MHz equipment. The Treasurer contacted KB4JNI who requested that these funds be turned over to the Virginia Digital Group.

At the direction of the President, any bills for reimbursement given to the Treasurer will be held for presentation for action at the next Board meeting.

Appreciation is given to those members of AARC who redonated to the club their original donation to M.A.R.A. which reduced the cost of the new 76 repeater to the club from \$2400 to \$1471.25.

● W4AUP1

GETTING THE WORD OUT

Perhaps you have had an amusing or refreshing experience that you would like to share with others. The question now is, how to submit the material to the AARC Bulletin? Actually it is quite easy. It is better for the Editor and myself if you do not send us handwritten or typed material. You can transmit it to us via several methods that are easy, and allow you to use some of your amateur radio equipment too! Packet is a good choice and you have the option of sending it to WA4TFZ's PBBS (CHO), KC4YLX's DX Cluster or connecting directly to Melissa (KD4GRM) or myself (ED, KC4YLX). If you find yourself without packet, you know what to ask for at Christmas, or you can use that modem connected to your telephone and link to Pat's Place BBS at (804) 973-8235. If you have never uploaded a message to any of the above places, please get in touch with one of the sysops and ask how. Oh yes, when you use an electronic method to send us information, PLEASE DO NOT USE ALL CAPS. Thank you.

What if you do not have packet, and haven't gotten around to getting a modem for your computer? Well, just place a 3.5" or 5.25" disk into your floppy drive and send us the file via diskette (don't use all caps here, either). We can use either HD or DD disks and would like the file to be in ASCII format, but can convert it from several different word processing formats if need be.

Now if your computer is not working, then by all means send in typed pages and we will get it into the Bulletin. Remember, the deadline is the 15th of each month for the following month's Bulletin.

● Ed KC4YLX



As with the crystal mike, the diaphragm, used with a dynamic mike will, in and of itself, do nothing useful. In this kind of mike, the diaphragm is attached to a coil of wire. Thus, when the diaphragm moves, so does the coil. This coil is placed in very close relationship to a magnetic assembly. (I say this because this assembly is more than a magnetic. It involves some surrounding metal, usually called a polepiece.)

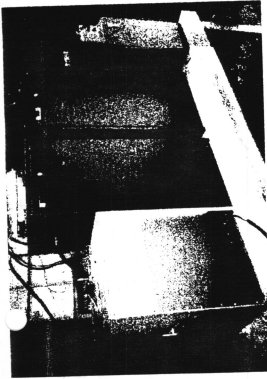
Any time that we have a coil moving with respect to a magnetic field, an electrical voltage will be produced across the turns of the coil, and can be extracted via the connections to the beginning and ending wire which forms the coil. This is the exact, same principle upon which electric power is generated in power plants, and which supplies power to run the appliances in your home.

So we have a diaphragm which moves in accordance with the amplitude and frequency of the sound waves which strike it. We have a coil which is forced to move in accordance with the movement of the diaphragm. Because that coil is in the presence of a "magnetic circuit," a voltage is produced across the coil, and this voltage is in accordance with the amplitude and the frequency of the sound waves which forced the diaphragm to move in the first place.

Unlike the mighty generators which supply power to our homes, the "generator" in the dynamic microphone produces a very tiny voltage. The diaphragm moves only a very small distance and the coil has very few turns into which voltage can be induced. Typically, a dynamic mike will produce signals from perhaps 1 millivolt (mV) to as much as 50 mV when really driven by a loud talker.

As is true of the crystal and ceramic microphones, voltage, when fed into the voicecoil of a dynamic mike, cause that coil to move with respect to the magnetic fields which surround it. Thus, the diaphragm moves in accordance with the amplitude and the frequency of the voltage which is fed into the voicecoil.

Although it is difficult to understand the principle which results in a voltage being produced across the faces of a crystal when it is twisted, we can understand why our dynamic mike



Pictured above from left to right: 146.76 444.25
224.76 and MACHO. Sitting above MACHO is DXTROY.

MICROPHONES MICROPHONES! Part 2

The Dynamic Microphone. We still see a few crystal-type mikes used, notably the Estatic D-104. The vast majority of mikes today are, however, dynamic mikes.

As is true of any microphone, it is the job of the dynamic mike to change the energy of sound waves which strike its diaphragm into electrical voltages which our transmitters can use to modulate their output.

From this last sentence, you can see that, like the crystal mike, the dynamic mike also employs a diaphragm. When sound waves strike it, it moves in and out in response both the frequency and the amplitude of the sound waves. In other words, the diaphragm will move a greater distance inward and outward when the talker speaks louder than it will when he speaks softer. Also, the vibrations will occur faster as the voice of the talker rises in pitch and will vibrate more slowly as his voice pitch falls.

Congratulations!

The Foundation for Amateur Radio (FAR) announced their scholarship selections. Jensen Reitz Montambault, KC4GPZ, was awarded a \$1000 scholarship. Jensen, the daughter of Ken, KC4GQA, is a Second Year student at UVA, and only 17-years old. Also, she is the Fourth District Coordinator for the Young Ladies' Relay League (YLRL). Jensen's scholarship is sponsored by the Nanticoke Amateur Radio Club and is awarded annually to a qualified candidate from Maryland, Delaware or Virginia.

The Albemarle Amateur Radio Club congratulates Jensen and wishes her much luck!

ATLANTIC DIVISION HAMFEST SCHEDULE

SEP 12 Foundation for Amateur Radio - Gaithersburg, MD

OCT 17 Columbia ARA - West Friendship, MD

OCT 24 Mason-Dixon - Westminster, MD

Educational News

Due to time constraints, I have taken the liberty of writing this issue's Education News. By the time this goes to press, we will be gearing up for our next Novice/Technician class. As before, we will hold it at CATEC on Wednesday nights (unless something unforeseen occurs to change that). We expect to get this info out on both the Monday and Wednesday nets. We also hope to have the assistance of NORDQ as before. He can really put the word out and when he uses the radio, its even better.....hi. We plan, at this time, to run 14 weeks (1 introduction, 2 labs, 1 seminar, and 10 teaching).

Classes should start about Sept. 8th and we hope to finish up

around 1 2nd or 3rd week in December with VE session to follow. More details on that later. Bob - WA2MFI, has sent away for his VE Certification and should be certified by the time you read this. We are also looking for anyone who is interested in teaching. Its a lot of fun and the rewards are tremendous. If you are interested contact either WA2MFI or myself (KC4TOD). Bob, I hope you don't mind me writing this thing. We'll return to your melodious keystrokes next month.

● Bye for now...Bill

4-Sale

For Sale: 2m and 440 hi's - Alinco DJ100T 2 meter handheld. Excellent condition, capable of CTCSS tone encoding, 144-148 receive and xmit. With battery and charger. \$150 ICOM ICOM4AT (just like a 02AT but 450MHz). Excellent condition with battery and charger, capable of CTCSS encoding. \$200. Sam N4WJO 973-6384

Tandy 102 laptop w/24k. Good condition and has book, cassette cable, telephone cable and soft case. \$80.00 plus shipping if necessary. Contact Tom WA4HSI 703-337-2720.

100 watt Microwave Modules Ltd 70 cm linear amplifier. New. Aaron KC4WNL 842-3169

WANTED:

TNC multimode or packet only unit. Ian KD4SCV 6-9 PM 804/985-3545.

Large coil forms, preferable 4 pin base. Bob WA2MFI 977-4682 or 982-2227.

2m synthesized mobile rig. Kay KD4CUI 977-5226.

Tech Talk

So, where is Carter's Mountain, anyway? What's on Carter's Mountain? Our repeaters are on Carter's Mountain! AARC has maintained a presence on the peak of one of the highest mountains near Charlottesville for a long time now. Ask some of our more -mature- members just when the first amateur voice repeater was installed on the Mountain. You'll get some interesting stories. But back to the present - the Club maintains several voice repeaters on the Mountain, and with the addition of a 220 MHz machine, now has THREE up there for the benefit of all Hams in the area.

Recently the AARC purchased a 224.760 MHz new Hamtronics voice repeater and a like-new ICOM 2 meter repeater to replace the aging, but otherwise functional 146.760 MHz machine we've enjoyed in the past. So now what we have is:

146.760 MHz repeater with remotely programmable controller, with synthesized voice capability, full-featured duplex autopatch, commercial quality, completely solid-state AC line operated with battery backup.

224.760 MHz repeater is a pre-assembled Hamtronics machine with remotely programmable controller and hand-made duplexers, built by ITW and tuned by N4FWA

444.250 MHz repeater has a remotely programmable controller and the machine was built by N4AOP for the Club

These repeaters are here for YOUR use! Use them and encourage others.

These are just some of the machines that the Club operates. The 146.925 repeater, MACCHO, packet BBS and CHONDS are some of the other services available and we'll talk more about these in the future.

If you have questions about the Club repeaters, please contact Hein, N4FWA, Greg, N4QGS, Bob, KMDJU, Ron, K4RKA or any Club officer or member of the Technical Committee. They are always glad for an opportunity to give you their opinion...

● Greg N4QGS